CLAIMS

1. Method for processing a received signal, the signal being received from a dynamically fading channel, the method comprising the steps of:

detecting the fading characteristics of said fading channel; and

determining a quantization correction command for at least one segment of said received signal.

2. The method according to claim 1, further comprising the step of quantizing said at least one segment according to said quantization correction command, thereby producing a quantized signal.

3. The method according to claim 2, further comprising the step of decoding said quantized signal.

4. The method according to claim 3, wherein said step of decoding said quantized signal is performed while taking into account said quantization correction command with respect to said at least one segment.

5. The method according to claim 1, further comprising the step of demodulating said received signal.

6. The method according to step 1, wherein said step of detecting comprises the sub-steps of:

estimating the RMS of said received signal; and

computing the minimal and maximal quantities of the samples of said received signal.

7. The method according to claim 1, wherein said step of determining comprises the sub-step of estimating a preferred RMS value.

8. The method according to claim 7, further comprising the step of normalizing said received signal according to said preferred RMS value.

9. The method according to claim 1, wherein said step of detecting comprises the following sub-steps:

estimating the RMS of said received signal, thereby producing an Estimated_RMS value, and

estimating channel tap values $\hat{h}[n]$ from said received signal.

10. The method according to claim 9, wherein said step of determining comprises the following sub-steps:

calculating Θ_{min} and Θ_{max} values, wherein $\Theta[n] \equiv \left|\mathrm{Re}al\{\hat{h}[n]\}\right| + \left|\mathrm{Im}ag\{\hat{h}[n]\}\right|$, $\Theta_{max} \equiv Max_n\{\Theta[n]\}$, and $\Theta_{min} \equiv Min_n\{\Theta[n]\}$, and

determining a desired_RMS_fade value from said Θ_{min}, Θ_{max}, and $\Theta[n]$.

11. The method according to claim 9, further comprising the step of normalizing said samples.

12. The method according to claim 11, wherein said step of determining comprises the following sub-steps:

calculating $\Theta_{\min}$ and $\Theta_{\max}$ values, wherein $\Theta[n] \equiv \left|\mathrm{Re}al\{\hat{h}[n]\}\right| + \left|\mathrm{Im}ag\{\hat{h}[n]\}\right|$, $\Theta_{\max} \equiv Max_n\{\Theta[n]\}$, and $\Theta_{\min} \equiv Min_n\{\Theta[n]\}$, and

determining a desired_RMS_fade value from said $\Theta_{\min}$, $\Theta_{\max}$, and $\Theta[n]$ and

wherein said step of normalizing is performed according to the following expression:

$$\tilde{Y}[n] = \frac{Desired\_RMS\_Fade}{Estimated\_RMS} \cdot Y[n]$$

wherein $Y[n]$ denotes a pre-quantized value of a selected sample and $\tilde{Y}[n]$ denotes a normalized pre-quantized value of said selected sample.

13. The method according to either of claims 10 and 12, wherein said desired_RMS_fade value is determined from said $\Theta_{\min}$, $\Theta_{\max}$, and $\Theta[n]$ according to a look-up table having $\Theta_{\max} - \Theta_{\min}$ at its input and Desired_RMS_Fade at its output.

14. In a receiver which includes a signal reception unit, a demodulator and a decoder, the receiver receiving a signal from a dynamically fading channel, the demodulator demodulating said received signal thereby producing demodulated signal, a quantizing device comprising;

a channel fading detection unit, connected to said signal reception unit, for detecting the fading characteristics of said dynamically fading channel;

a processor, connected to said channel fading detection unit, for processing said fading characteristics, thereby producing a correction command for at least one segment of said received signal;

a quantizing unit connected to said processor, said demodulator and said decoder, for quantizing said demodulated signal, thereby producing a quantized signal;

wherein said quantizing unit also corrects said at least one segment according to said correction command; and

wherein said decoder decodes said quantized signal.

15. The quantizing device according to claim 14, wherein said processor provides said correction command to said decoder and said decoder decodes said quantized signal according to said correction command.

16. The quantizing device according to claim 15, wherein said processor determines said correction command by calculating Θ_{min} and Θ_{max} values, wherein $\Theta[n] \equiv \left|\mathrm{Re}al\{\hat{h}[n]\}\right| + \left|\mathrm{Im}ag\{\hat{h}[n]\}\right|$, $\Theta_{max} \equiv Max_n\{\Theta[n]\}$, and $\Theta_{min} \equiv Min_n\{\Theta[n]\}$ and subsequently determining a desired_RMS_fade value from said Θ_{min}, Θ_{max}, and $\Theta[n]$.

17. The quantizing device according to claim 16, wherein said desired_RMS_fade value is determined from said Θ_{min}, Θ_{max}, and $\Theta[n]$ according to a look-up table having $\Theta_{max} - \Theta_{min}$ at its input and Desired_RMS_Fade at its output.

18. In a receiver which includes a signal reception unit, a demodulator, a quantizing unit and a decoder, the receiver receiving a signal from a dynamically fading channel, the demodulator demodulating said received signal thereby producing demodulated signal, a fading compensation device comprising;

a channel fading detection unit, connected to said signal reception unit, for detecting the fading characteristics of said dynamically fading channel;

a processor, connected to said channel fading detection unit, for processing said fading characteristics, thereby producing a correction command for at least one segment of said received signal;

a correction unit, connected to said processor, said demodulator and said quantizing unit, for correcting the demodulated segment corresponding to said at least one segment according to said correction command, thereby producing a corrected segment,

wherein said correction unit replaces said demodulated segment with said corrected segment at the input of said quantizing unit.

19. The fading compensation device according to claim 18, wherein said processor determines said correction command by calculating Θ_{min} and Θ_{max} values, wherein $\Theta[n] \equiv \left|\mathrm{Re}al\{\hat{h}[n]\}\right| + \left|\mathrm{Im}ag\{\hat{h}[n]\}\right|$, $\Theta_{max} \equiv Max_n\{\Theta[n]\}$, and $\Theta_{min} \equiv Min_n\{\Theta[n]\}$, and subsequently determining a desired_RMS_fade value from said Θ_{min}, Θ_{max}, and $\Theta[n]$.

20. The quantizing device according to claim 19, wherein said desired_RMS_fade value is determined from said Θ_{min}, Θ_{max}, and $\Theta[n]$ according to a look-up table having $\Theta_{max} - \Theta_{min}$ at its input and Desired_RMS_Fade at its output.

21. The fading compensation device, according to claim 18, wherein said processor is further connected to said decoder, thereby providing said correction command to said decoder for decoding the quantized representation of said corrected segment, with respect to said correction command.

22. A receiver comprising:

a signal reception unit, for receiving a signal from a dynamically fading channel;

a demodulator, connected to said signal reception unit, for demodulating said received signal, thereby producing a demodulated signal therefrom;

a quantizing processor, connected to said demodulator and to said signal reception unit, for analyzing said received signal and for quantizing said demodulated signal, thereby producing a quantized signal; and

a decoder, connected to said quantizing processor, for decoding said quantized signal,

wherein said quantizing processor normalizes said demodulated signal according to the estimated fading of said received signal.

23. The receiver according to claim 22, wherein said received signal is a DS-CDMA signal and wherein said demodulator is a rake receiver.

24. The receiver according to claim 23, wherein said quantizing processor analyzes said received signal by summing the channel taps of selected fingers.

25. The receiver according to claim 22, wherein said decoder is a Viterbi decoder.

26. The receiver according to claim 22 or 25, wherein said quantizing processor analyzes said received signal by calculating $\Theta_{\min}$ and $\Theta_{\max}$ values, wherein $\Theta[n] \equiv \left|\mathrm{Re}al\{\hat{h}[n]\}\right| + \left|\mathrm{Im}ag\{\hat{h}[n]\}\right|$, $\Theta_{\max} \equiv Max_n\{\Theta[n]\}$, and $\Theta_{\min} \equiv Min_n\{\Theta[n]\}$, and subsequently determining a desired_RMS_fade value from said $\Theta_{\min}$, $\Theta_{\max}$, and $\Theta[n]$.

27. The receiver according to claim 26, wherein said quantizing processor calculates said desired_RMS_fade value is determined from said $\Theta_{\min}$, $\Theta_{\max}$, and $\Theta[n]$ according to a look-up table having $\Theta_{\max} - \Theta_{\min}$ at its input and Desired_RMS_Fade at its output.